Towards development of predictive models for the Black Sea physical-biogeochemical system

T. Oguz (1), G. Korotaev (2)

(1) Institute of Marine Sciences, Middle East Technical University, Erdemli 33731, Mersin, Turkey (oguz@ims.metu.edu.tr), (2) Marine Hydrophysical Institute, Ukranian Academy of Sciences, Sevastopol, Ukraine.

As a part of the Black Sea-GOOS Programme, our ongoing efforts is to built up an interdisciplinary modeling tool which will have some capability of predicting (i) stocks of marine living resources in both lower and higher trophic levels, (ii) realistic description of the vertical structures of hydrodynamical and biogeochemical fields special for the Black Sea. On the basis of our past experience with various simplified process-oriented models, the current efforts on interdisciplinary model configuration is devoted to building up a 5 km resolution system using the Princeton Ocean Model for the circulation and the ECOBLACK Model for the ecosystem. The latter model is evolved during the last 10 years of its development, and includes a foodweb structure involving four phytoplankton groups (diatoms, dinoflagellates, coccolithophores, small phytoplankton), .mesozooplankton, opportunistic species and gelatinous carnivores (Noctiluca, Aurelia, Mnemiopsis), and microbial loop. This fairly sophisticated, but essential, representation of the Black sea ecosystem is further coupled with the nitrogen cycle and a set of oxidation-reduction reactions near the oxic-anoxic interface. A set of results are presented from the circulation and ecosystem model simulations predicting essential features of the upper layer flow structure and simultaneous controls by anthropogenic-based nutrient enrichment and top-down grazing pressure introduced by gelatinous carnivores on the annual plankton structure.